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Local Tree Seed Collection Zones for California

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LOCAL TREE SEED COLLECTION ZONES FOR CALIFORNIA

By

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The forested areas of California were delineated into 13 broad seed collection zones in 1946 based on forest type and site (Fowells, 1946) and the limits of the northern zones were extended into Oregon in 1955 (Roy, 1955). Almost all of these zones and their extensions exceed the 100-mile latitude and 1,000-foot elevation limitations specified in the seed policy adopted by the U. S. Department of Agriculture in 1939 (McCall, 1939). The local seed zones delineated in figure 1 corrects these shortcomings.

Many foresters have recognized the need for the establishment of "local seed zones" in California. An exact evaluation of the effect of seed origin on seedling and tree performance has been impossible under the present broad seed zone classification.

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Frequently the variation within these broad zones is greater than the variation between two adjacent zones. Even so, nursery studies have indicated consistent differences in the performance of planting stock from several seed zones grown at the Federal and State nurseries (Baron and Schubert, 1963; Schubert and Baron, 1965; Stone and Benseler, 1962). Furthermore, provenance studies with ponderosa pine (Callaham, 1960; Callaham and Liddicoet, 1961; Squillace and Silen, 1962), Douglas-fir (Isaac, 1948), and lodgepole pine (Critchfield, 1957) have indicated striking differences related to seed origin. This variation is presently being masked by the practice of lumping all the seed collected within each zone which in extreme instances may involve seed collected over a range of 200 to 250 miles and elevations of 2,000 to 3,000 feet.

Considerable discussion has been generated during the past 2 decades on how best to delineate the forested areas in California into local seed zones. California's extremely variable topography precluded all attempts to define areas of similar environmental conditions. Abrupt changes in site characteristics caused by changing elevations, aspects, soils, drainage, climate, and other factors have created a maze of many thousand separate provenances.

A partial solution to the seed origin dilemma is to divide the original 13 seed collection zones into units approximately 50 miles in latitude and into bands of 500-foot elevation subzones. The seed collection zones of northwestern California were recently delineated into these 50-mile local seed zones (Roy, 1963a). This delineation into local seed zones has been extended to the remaining broad collection zones (Fig. 1).

In figure 1, the original 13 seed collection zones have been retained as "major zones" and two more added to include areas predominately in hardwoods. The names and numbers of the original zones have been retained to provide continuity with past work. The two new major zones have been designated as Coast Range Hardwoods (Zone 14) and Sierra West Side Hardwoods (Zone 15).

Major zones 1, 6, 9, 10, and 13 have been enlarged slightly to include areas that support or may support timber growth. These extensions were added to the major zone which included approximately the same general species complex. Some of the extensions may have been appended to a different zone without materially affecting the end result--namely to provide a means to identify the seed with a specific geographic location by its local zone number.

The boundaries for local seed zones were selected to coincide with prominent roads, streams, or ridges and in a few places with county lines to facilitate their relocation on the ground. The north and south boundaries were spaced approximately at 50-mile intervals as done by Roy (1963a) for the northwestern California. Similarly, east and west boundaries were delineated to divide excessively wide major zones.

Elevation subzone boundaries were omitted from the small scale map in figure 1. For field use, these lines can be drawn on large scale county or National Forest maps to coincide with the 500-foot contours. The elevation subzones should be designated with a

2-digit number indicating the elevation of the upper limit of the subzone. For example, the number for the 0- to 500-foot subzone would be 05 and for the 4,000 to 4,500 subzone it would be 45. This system provides a code number to be entered on the tree seed lot card proposed by Roy (1963b) and also identifies the elevational zone without need for a reference legend.

This system of local zones based on 50-mile latitude and 500-foot elevation permits use of seed within the presently accepted limits for seed provenance. For example, within major seed zones, seeds from any of the local zones can be used within that zone or the adjacent ones without violating the 100-mile limitation. Similarly, seeds can be used within the elevational subzone or the adjacent subzones of the group of local zones without differing more than 1,000 feet in elevation. Furthermore, seeds may also be used in adjacent major zones provided the tree species under consideration is well represented in the adjacent local zone. Special precautions must be taken in areas of species transition to insure fulfillment of the silvical requirements of the introduced species.

In summary, two basic needs are satisfied by the adoption of the local seed zone classification. First, those responsible for the regeneration work will have a sound criterion to plan seed collections to meet their reforestation requirements for specific areas. Seeds and planting stock will be of the proper origin. Records by local seed zones will also indicate whether seeds in storage are suitable for emergency use--something which cannot be done under

the existing seed zone classification. Secondly, the local seed zones will provide researchers with a basis to evaluate geographic variation, to test the adequacy of the local seed zone classification, and to recommend needed adjustment in seed zone boundaries.

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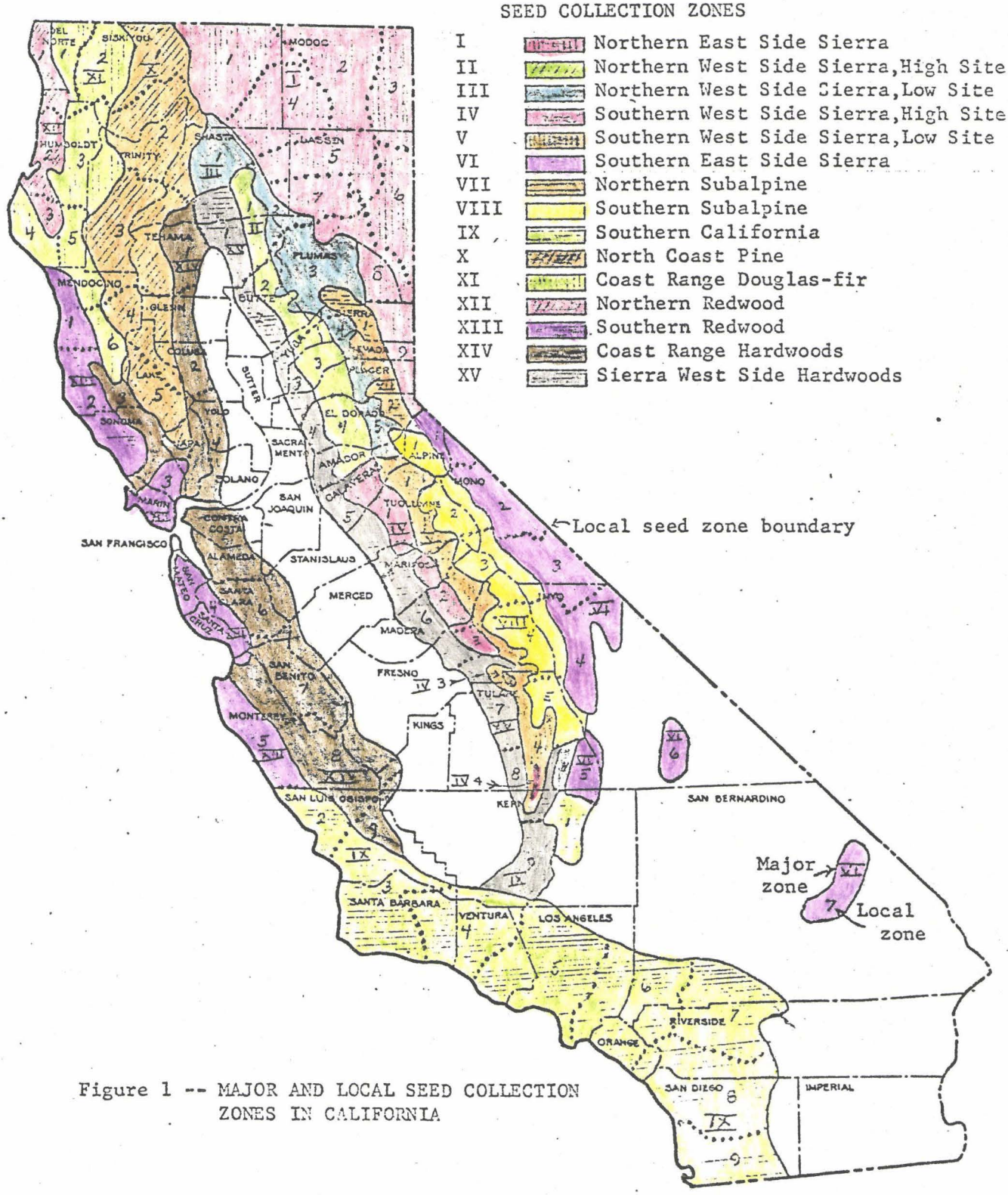
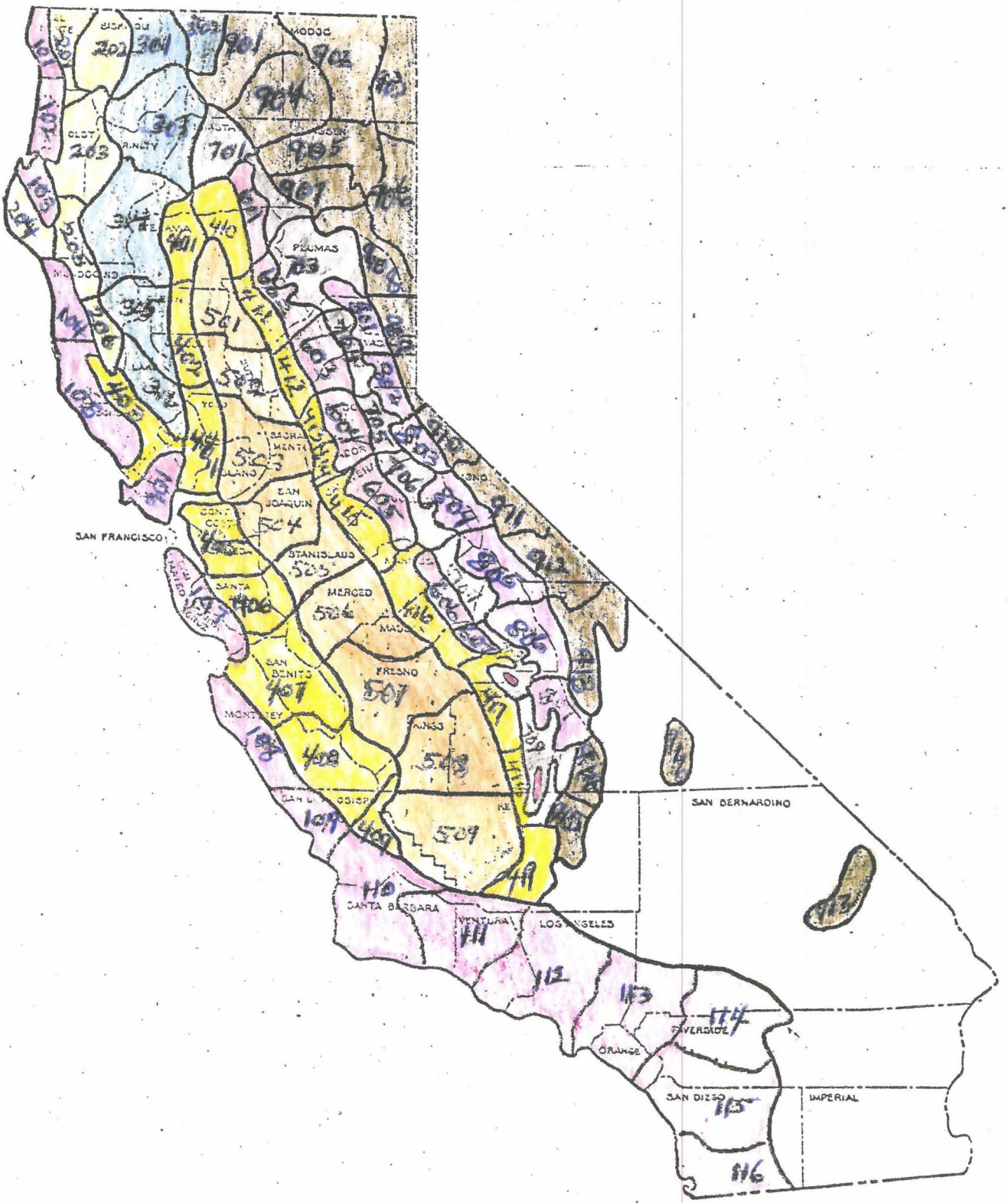


Figure 1 -- MAJOR AND LOCAL SEED COLLECTION ZONES IN CALIFORNIA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